

## ChemRisk/Shonka Research Associates, Inc., Document Request Form

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J. Lamb / 1034A  
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K/EM-354

**SANTITIZED VERSION OF EXTRACT FROM MONTHLY REPORT ON GASEOUS  
DIFFUSION DEVELOPMENT FOR PERIOD ENDING OCTOBER 31, 1977**

**(EXTRACTED FROM CRD DOCUMENT # K/GD-1820/PT1)**

Compiled by  
S. G. Thornton  
Environmental Management Division  
OAK RIDGE K-25 SITE  
for the Health Studies Agreement

December 21, 1995

Oak Ridge K-25 Site  
Oak Ridge, Tennessee 37831-7314  
managed by  
LOCKHEED MARTIN ENERGY SYSTEMS, INC.  
for the U.S. DEPARTMENT OF ENERGY  
under Contract DE-AC05-84OR21400

This document has been approved for release  
to the public by:

*QJ Kirtman /sgt* 3/1/96  
Special Information Officer  
Oak Ridge K-25 Site

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PLANT RECORDS SECRET NO.
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K/GD-1820, Part 1

KGD 1820 PT1 54 A



**K25RC**

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PLANT RECORDS

MONTHLY REPORT  
ON

GASEOUS DIFFUSION DEVELOPMENT (U)

FOR PERIOD ENDING OCTOBER 31, 1977

Compiled by  
Tony A. Angelelli

Gaseous Diffusion Development Division  
J. R. Merriman, Director

~~Classification changed to U~~  
~~11/1/75~~  
~~Signature~~  
~~This document is based on data furnished to the DOE Office of Gaseous Diffusion Development, November 1, 1977~~

UNION  
CARBIDE

OAK RIDGE GASEOUS DIFFUSION PLANT  
OAK RIDGE, TENNESSEE

prepared for the U.S. DEPARTMENT OF ENERGY under  
U.S. GOVERNMENT Contract W-7405 eng 26

~~RESTRICTED DATA~~  
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Tony A. Angelelli  
Classifying Official  
Technical Staff Assistant,  
Gaseous Diffusion Development Division  
Title of Position

Uranium Detection in Gaseous Effluent Streams: A Conceptual Design Study (U) - M. J. Bartkus (Collins - Instrumentation and Control Systems Development); A. M. Billings (Engineering Division)

[Keywords: Uranium Determination; Radiation Measuring Instruments; Space Recorder; Stack Sampling]

Technology for Energy Corporation\* (TEC) has completed tests of ion current pulse measuring electronics in K-402.9 under purge cascade operating conditions. Mechanical vibration signal frequencies overlapped the expected pulse frequencies making spectral analysis of the tape recorded pulse signals essentially useless for pulse characterization studies. TEC recommends as the next approach the use of counting mode electronic circuits to enable the counting of uranium alpha electron pulses in the presence of smaller beta pulses from contaminating technetium. Minor modifications to the detector (signal can) are also proposed.

TEC's recommendation for a proof-in-principle experiment under process operating conditions, mentioned previously\*\*, was implemented because of the need for an improved method of detecting low concentrations of uranium in gaseous effluents from diffusion plants and later from the centrifuge plant.

Ion pulse waveforms with background noise waveforms were tape recorded using TEC's designed electronics attached to each of two signal cans (one clean and one technetium contaminated) through which gas from a common source flowed. Recordings were made at several accelerating high voltage levels for each of three gas streams. Output current versus applied high voltage data were also taken.

The latter data revealed an unusual and unaccountable linear relationship between current and voltage when purge gas was flowing. Current differences resulting from differences in  $UF_6$  content in the gas were not found.

Numerous signal enhancement techniques were used in the TEC facilities to analyze the tape recorded data without success.

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\*Knoxville, Tennessee.

\*\*Monthly Report on Gaseous Diffusion Development for Period Ending August 31, 1977 (U), Union Carbide Corporation, Nuclear Division, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee. September 12, 1977 (K/GD-1550, Part 11) SECRET.

TEC recommends using counting mode electronics in a proof-in-principle experiment to demonstrate freedom from vibration-induced noise signals and the ability to count uranium alpha electron pulses in the presence of beta pulses produced by technetium.

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**SANITIZED VERSION OF EXTRACT FROM MONTHLY REPORT ON GASEOUS  
DIFFUSION DEVELOPMENT FOR PERIODS ENDING DECEMBER 31, 1978 AND  
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**Compiled by  
S. G. Thornton  
Environmental Management Division  
OAK RIDGE K-25 SITE  
for the Health Studies Agreement**

**December 21, 1995**

**Oak Ridge K-25 Site  
Oak Ridge, Tennessee 37831-7314  
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LOCKHEED MARTIN ENERGY SYSTEMS, INC.  
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PLANT RECORDS RECEIPT NO.
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Report Number: K/GD-1820, Part 14

KGD 1820 PT14 40 A



\*KGD 1820 PT14 40 A\*

MONTHLY REPORT ON  
GASEOUS DIFFUSION DEVELOPMENT  
FOR PERIODS ENDING DECEMBER 31, 1978 AND  
JANUARY 31, 1979 (U)

Compiled by  
Tony A. Angelelli

**K25RC**

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Enrichment Technology Division  
J. R. Merriman, Director

FEBRUARY 22, 1979

UNION  
CARBIDE

OAK RIDGE GASEOUS DIFFUSION PLANT  
OAK RIDGE, TENNESSEE

prepared for the U.S. DEPARTMENT OF ENERGY under  
U.S. GOVERNMENT Contract W-7405 eng 26

SRD classification changed to CRD

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ADD signature

Date

11 Oct 95  
Tony A. Angelelli  
Classifying Official

Technical Staff Assistant  
Enrichment Technology Division

Title of Position

SPONSOR: J. R. Merriman

~~SECRET~~

-2-

~~SECRET~~

Space Recorder (U) - M. J. Bartkus (Riepe - Systems and Equipment Technology)  
A. M. Billings (Baker - Engineering Division)

[Keywords: Uranium--Releases; Space Recorder]

Technology for Energy Corporation (TEC) has completed the third phase of a design study of equipment for detecting low (parts-per-million) concentrations of uranium in gaseous effluent streams from gaseous diffusion plants. TEC's major objective has been to modify and improve the existing Space Recorder instrument. To date their efforts have not resulted in a viable detection system for several reasons:

1. mechanically induced vibration effects in the cascade environment,
2. contamination by technetium-99 as a beta-emitting dust, and,
3. signal variability produced by the quenching action of halogen compounds (coolant) in the effluent stream.

Follow-on work by TEC is being considered, and TEC has been asked to provide a report on their efforts to date. The use of a quadrupole mass spectrometer for this application will be evaluated by Goodyear at the Portsmouth plant with initial results expected in May, 1979.

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